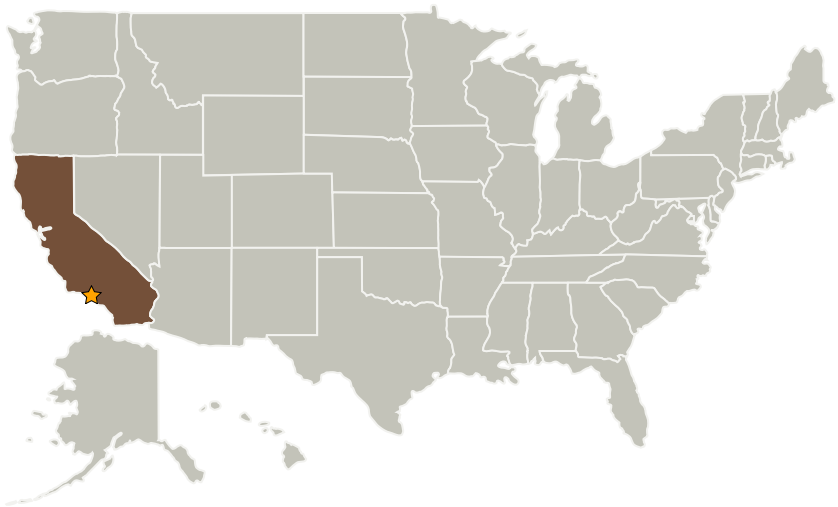
Highly Reflecting, Broadband Deformable Membrane Mirror for Wavefront Control Applications, Phase I

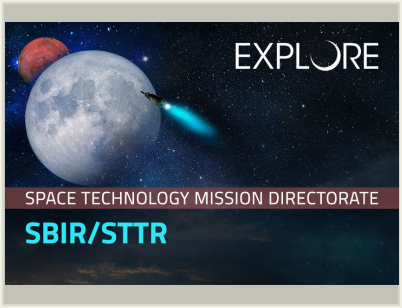
Completed Technology Project (2008 - 2009)

Project Introduction

This Phase I STTR project will develop a highly reflecting, broadband, radiation resistant, low-stress and lightweight, membrane integrated into an electrostatically actuated microelectromechanical systems (MEMS) device for wavefront control applications in space telescopes. The underlying technology builds on nanomaterial coatings and electro-optical modeling competency of the company. InnoSense LLC (ISL) will collaborate with Dr. Harold Kahn, Research Associate Professor, Department of Materials Science and Engineering at Case Western Reserve University, to integrate the low-cost, flexible nanocomposite membrane mirror into a MEMS device. The Phase I project would demonstrate: (a) a membrane mirror capable of high broadband reflectivity; (b) deflections > 20-30 micron; and (c) large temporal bandwidth at frequency > 1 KHz. The focus of Phase II will be optimization of the reflecting membrane, refinements to the design of the deformable membrane mirror (DMM) device, accompanied by extensive evaluation of prototype DMMs for their ability to correct for large wavefront aberrations at high frequencies to mitigate the effects of atmospheric turbulence, and enable high fidelity imaging capability. To ensure success of this project, ISL has assembled a technical team with a cumulative 70 person-years of experience in nanomaterials coatings, MEMS, mechanical and electro-optical modeling.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Innosense, LLC	Supporting Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Torrance, California

Primary U.S. Work Locations
California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories
    - TX08.2.1 Mirror Systems